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(19)(CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Motorcycle Tire Having Curved, Swept-Back Profiled Tread Grooves

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TITLE OF THE INVENTION:

MOTORCYCLE TIRE HAVING CURVED, SWEPT-BACK PROFILED TREAD GROOVES

ABSTRACT OF THE DISCLOSURE:

A motorcycle tire having a tread with a central zenith portion and edge portions is provided. The tread has curved, swept-back profiled grooves that in the zenith portion extend at a smaller angle to a circumferential direction of the tire than they do in the edge portions. The profiled grooves are disposed in respective right hand and left hand portions of the tread, with first, non-adjacent ones of the profiled grooves of a given tread portion being interconnected by connecting grooves, which are disposed in the zenith portion, to form inclined U-shaped grooves. Second ones of the profiled grooves are disposed in each of the U-shaped grooves, whereby these second profiled grooves are isolated from all other grooves. The U-shaped grooves of the left hand tread portion are offset from the U-shaped grooves of the right hand tread portion in the circumferential direction of the tire, and all of the grooves of the left hand tread portion are isolated from the grooves of the right hand tread portion.

Background of the Invention

The present invention relates to motorcycle tires having curved, swept-back profiled grooves that in the zenith portion extend at a smaller angle relative to the circumferential direction of the tire than they do in the edge portions of the tread. The profiled grooves are disposed in a left hand and right hand portion of the tread, with some of the non-adjacent ones of the profiled grooves of a given tread portion being interconnected by connecting grooves, which are disposed in the zenith portion, to form inclined U-shaped grooves. Disposed within each U-shaped groove are further profiled grooves that are isolated from all other grooves, with the U-shaped grooves of the left hand portion of the tread being offset from the U-shaped grooves of the right hand portion of the tread.

Such a tire, despite a relatively low negative fraction, which permits soft and hence readily bonding rubber mixtures, also permits a favorable positive frictional connection in the longitudinal direction, in other words to transmit braking and acceleration forces, even on wet roads. However, the transmission of lateral forces on wet roads does not yet seem to be optimum. This is perceived particularly when brief lateral wind blasts are

encountered, such as occurs, for example, when one leaves the sheltered side after passing a truck.

The inventive tire differs from the known tire, where none of the adjacent, curved, swept-back profiled grooves of a given tread half are interconnected by connecting grooves that are disposed in the zenith portion, so that with the known tire no inclined U-shaped grooves are provided. With a comparable support or contact surface and a comparable negative profile fraction, the water displacement capacity of this known tire is less than that of the general inventive tire, because all of the profiled grooves of the known tire are embodied as blind grooves in the zenith portion; in other words, the grooves end in the zenith portion, so that the water that is flowing along these grooves accumulates or backs up at this location since it cannot flow off any further.

It is therefore an object of the present invention to further improve the lateral force stability of motorcycle tires of the generally described inventive type when the angle of tilt is somewhere in the vicinity of 0.

Brief Description of the Drawings

This object, and other objects and advantages of the present invention, will appear more clearly

from the following specification in conjunction with the accompanying schematic drawings, in which:

Fig. 1 shows a portion of one exemplary embodiment of an inventive front tire tread configuration; and

Fig. 2 shows a portion of one exemplary embodiment of an inventive rear tire tread configuration.

Summary of the Invention

The motorcycle tire tread of the present invention is further characterized in that all of the grooves of the left hand tread portion are isolated from the grooves of the right hand tread portion. With this inventive tread configuration, in the contact surface region no water can surmount the center line of the tread. This means that none of the water displaced in the left hand portion of the tread can flow over to the right hand portion of the tread; conversely, no water that has been displaced by the right hand portion of the tread can flow over to the left hand portion of the tread. Consequently, when transverse slippage or drift occurs, as is unavoidable when lateral forces are transmitted, no sliding in the axial direction

is associated with the gradual sliding in the circumferential direction beyond the traveling speed. In this way, at less of a tilt angle inventive tires permit greater transverse forces to be transmitted than was previously possible. This advantage becomes particularly effective on wet roads while traveling straight ahead when brief, severe wind gusts act upon the motorcycle driver. In contrast to a steady travel in curves, the transverse forces that are necessary for a very rapid reaction are transmitted at an only slight angle of tilt, approximately $\pm$ 15°.

In contrast to tires of the aforementioned general type, the basic difference is that the negative profile fraction of the inventive tires in the zenith portion is at least 30% greater than in further axially outwardly disposed tread surface portions. At the same time, the number of block edges in the zenith portion that extend in the circumferential direction is increased, so that in contrast to this aforementioned type of tire there is also achieved an increased transfer of transverse forces on wet roads with slight tilt.

The advantages of the inventive profiling or configuration of motorcycle tire treads with regard to steering precision on wet roads are achieved

without drawback with the transfer of longitudinal forces.

Especially with regard to the front tires, it is desirable that the connecting grooves, which interconnect non-adjacent ones of the curved, swept-back profiled grooves of the same tread half portion, extend parallel to the circumferential direction of the tire. It is also advisable with front tires that the curved, swept-back profiled grooves be directed counter to the direction of forward travel.

In contrast, for large-volume tires, especially with respect to the rear tires, it is expedient to dispose the connecting grooves at an angle of 30 to 60° relative to the circumferential direction of the tire. In this way, a lesser and more gradual reduction of the negative profile in a direction toward the axial tread edges is achieved. With rear tires, it is advisable that the curved, swept-back profiled grooves be directed in the direction of forward travel. The reason for this is that rear motorcycle tires primarily have to transfer positive drive forces in the longitudinal direction, while the braking forces hardly play any role at the rear tire due to the high center of gravity relative to the wheel base. With the front

tire, the opposite applies, as is known.

In the context of the present application, the designation "U-shaped groove" refers to the combination of three interconnected profiled grooves, and in particular the interconnection of two swept-back grooves via a further groove that extends transverse thereto and that within the context of the instant application is designated a connecting groove. The result, when viewed in a drawing, is a configuration that has a shape of the letter "U".

It has proven to be advantageous to respectively dispose between the various U-shaped grooves of a given tread portion either one or two further curved, swept-back profiled grooves that are isolated from all other grooves, i.e. do not communicate with any other grooves. For the filigree-like tread configuration of the front tire, it has proven to be advantageous to dispose just one further curved, swept-back profiled groove between the respective U-shaped grooves, whereas for the larger-surface tread profile of the rear tire it has proven to be advantageous to dispose two further curved, swept-back profiled grooves between respective U-shaped grooves.

Regardless of the intended use of the front or

rear tire, it has proven to be advantageous to dispose within each U-shaped groove one further curved, swept-back profiled groove that is isolated from all other grooves. In this way, an advantageous length of the connecting groove relative to the length of the contact surface is achieved.

With the tread configuration of the front tire, it has been shown to be important for the connecting grooves of the left hand and right hand tread portions to alternate over the circumference of the tire in such a way that at each circumferential location, a connecting groove is present right next to the zenith portion. This advantageous configuration results if, as previously described, the number of further, isolated profiled grooves within the U-shaped grooves coincides with the number of further, isolated profiled grooves disposed between the U-shaped grooves.

Further specific features of the present invention will be described in detail subsequently.

Description of Preferred Embodiments

Referring now to the drawings in detail, in both the exemplary embodiment of an inventive front tire configuration as shown in Fig. 1 and in the

exemplary embodiment of an inventive rear tire configuration as shown in Fig. 2, the respective tires are designated by the reference numeral 1. The profiled or shaped grooves are indicated generally by the reference numeral 2, followed by a decimal and further numbers to differentiate the various grooves from one another. For example, 2.0 designates the isolated profiled grooves that are surrounded by a U-shaped groove 10, with 2.10 designating the profiled grooves that are a part of the U-shaped grooves 10. Thus, the isolated profiled grooves that are disposed within the U-shaped grooves 10 are designated 2.0, while the isolated profiled grooves that are disposed between two adjacent U-shaped grooves of the same row are designated with the reference numeral 2.1.

In both Figs. 1 and 2, the zenith or center line of the tire is designated by the reference numeral 3. The zenith portion 9 that is disposed about the center line 3 includes the connecting grooves 8. Thus, the zenith portion 9 belongs partly to the left row or tread half 6 and partly to the right row or tread half 7. In Fig. 1, the boundary between the left and right rows extends linearly along the center line 3, while in Fig. 2 this boundary follows the wavy dot-dash line 13

within the zenith portion 9. The critical feature that is common to both embodiments is that the boundary between the left and right rows exclusively follows a positive course, i.e. does not cross or is not tangential to any grooves, which in the terminology of the art would designate a negative course.

In the edge portions 4 of the tread 5, it is expedient that not all of the ends of the profiled grooves 2 be aligned with one another; if the ends of the grooves are offset slightly relative to one another, passing over the holding or transition boundary when tilting or banking is too great is less abrupt.

The profiled grooves 2 extend more steeply in the zenith portion 9. In other words, in the zenith portion 9 the profiled grooves 2 form a smaller angle α with the circumferential direction C (the center line 3) than they do in the edge portions 4 of the tread 5.

In both Figs. 1 and 2, the direction of forward travel is indicated by an arrow 11 near the bottom of the page.

Now that the features common to both illustrated embodiments have been described, the features that are different for the two preferred

embodiments will be described.

With the configuration for the front tire illustrated in Fig. 1, the direction of rise or sweep-back of the configuration is contrary to the direction of travel 11.

In contrast, in the rear tire illustrated in Fig. 2, the direction of rise or sweep-back of the configuration is in the direction of travel or orientation of rotation 11. Whereas with the front tire of Fig. 1 only a single isolated profiled groove 2.1 is disposed between the various U-shaped grooves 10, in the rear tire configuration of Fig. 2, two isolated profiled grooves 2.1 are disposed between the various U-shaped grooves. The preferred embodiment of the inventive rear tire configuration illustrated in Fig. 2 shows that the connecting grooves 8 are disposed at an angle of inclination β of between 30 and 60° relative to the circumferential direction C, whereas in the embodiment of the front tire illustrated in Fig. 1, the connecting grooves 8 extended parallel to the circumferential direction C. Furthermore, in the preferred rear tire profile of Fig. 2, the angle of inclination β of the connecting grooves 8 in the zenith portion 9 corresponds to the angle of inclination α of the closest adjacent leg 2.12 of

the next adjacent profiled groove 2.10 of a U-shaped groove 10. This wattlework-like configuration enables not only an increased ability to transmit lateral forces, but at the same time enables a high transfer of longitudinal forces.

The inventive motorcycle tire configurations are particularly suitable for heavy motorcycles used on the road, and for racing machines on wet stretches.

The present invention is, of course, in no way restricted to the specific disclosure of the specification and drawings, but also encompasses any modifications within the scope of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A motorcycle tire having a tread with a central zenith portion and edge portions, said tread of said tire further comprising:

curved, swept-back profiled grooves that in said zenith portion extend at a smaller angle to a circumferential direction of said tire than they do in said edge portions, with said profiled grooves being disposed in respective right hand and left hand portions of said tread, with first, non-adjacent ones of said profiled grooves of a given one of said tread portions being interconnected by connecting grooves, which are disposed in said zenith portion, to form inclined U-shaped grooves that open out toward one of said edge portions, with second ones of said profiled grooves being disposed in each of said U-shaped grooves, whereby said second ones of said profiled grooves are isolated from all other grooves, with said U-shaped grooves of said left hand tread portion being offset from said U-shaped grooves of said right hand tread portion in said circumferential direction of said tire, and with all of said grooves of said left hand tread portion being isolated from said grooves of said right hand tread

portion.

2. A motorcycle tire according to claim 1, in which said connecting grooves extend parallel to said circumferential direction of said tire.

3. A motorcycle tire according to claim 1, in which said curved, swept-back profiled grooves are directed counter to a forward direction of travel.

4. A motorcycle tire according to claim 1, in which said connecting grooves are disposed at an angle of from 30 to 60° relative to said circumferential direction of said tire.

5. A motorcycle tire according to claim 1, in which said curved, swept-back profiled grooves are directed in a forward direction of travel.

6. A motorcycle tire according to claim 1, in which just one of said sacond ones of said profiled grooves is disposed in each of said U-shaped grooves.

7. A motorcycle tire according to claim 1, in which just one respective third one of said curved, swept-back profiled grooves is disposed between each two U-shaped grooves of a given one of said tread portions, with said third ones of said profiled grooves being isolated from all other grooves.

8. A motorcycle tire according to claim 1,

in which two respective third ones of said curved, swept-back profiled grooves are disposed between each two U-shaped grooves of a given one of said tread portions, with said third ones of said profiled grooves being isolated from all other grooves.

9. A motorcycle tire according to claim 1, in which to provide a front tire, said connecting grooves extend parallel to said circumferential direction of said tire; said curved, swept-back profiled grooves are directed counter to a forward direction of travel; just one of said second ones of said profiled grooves is disposed in each of said U-shaped grooves; and in which just one respective third one of said curved, swept-back profiled grooves is disposed between each two U-shaped grooves of a given one of said tread portions, with said third ones of said profiled grooves being isolated from all other grooves.

10. A motorcycle tire according to claim 1, in which, to provide a rear tire, said connecting grooves are disposed at an angle of from 30 to 60° relative to said circumferential direction of said tire; said curved, swept-back profiled grooves are directed in a forward direction of travel; just one of said second ones of said profiled grooves is disposed in each of said U-shaped grooves; and in

which two respective third ones of said curved, swept-back profiled grooves are disposed between each two U-shaped grooves of a given one of said tread portions, with said third ones of said profiled grooves being isolated from all other grooves.

11. A motorcycle tire according to claim 9, in which the boundary between said left hand and right hand tread portions extends linearly through the center of said zenith portion.

12. A motorcycle tire according to claim 10, in which the boundary line between said left hand and right hand tread portions follows a wavy course within said zenith portion.

13. A motorcycle tire according to claim 9, in which said U-shaped grooves of said left hand and right hand tread portions are offset from one another in such a way that said connecting grooves of said left hand and right hand tread portions continuously alternate with one another.

FIG.1

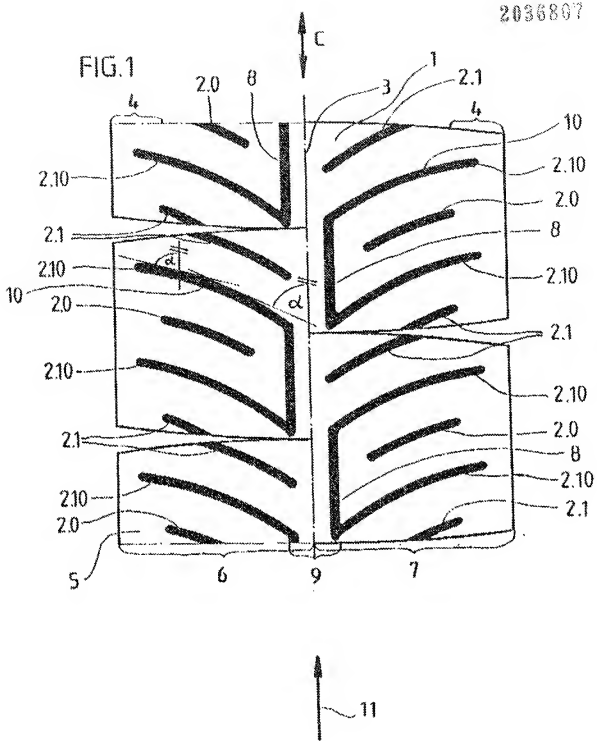

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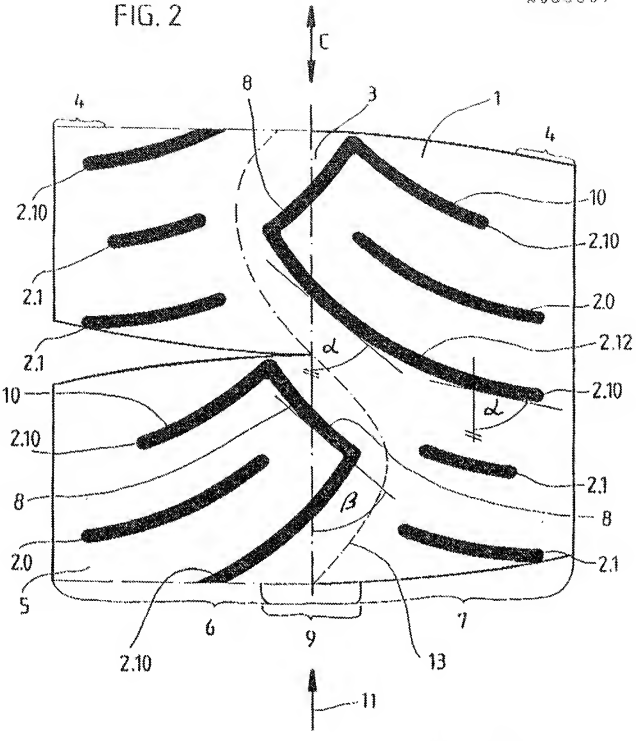
FIG. 2



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